



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,514	03/22/2004	Wilhelm Frohs	SGL 02/23	3892
24131 7590 12/27/2006 LERNER GREENBERG STEMER LLP P O BOX 2480 HOLLYWOOD, FL 33022-2480			EXAMINER DESAI, ANISH P	
			ART UNIT 1771	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		12/27/2006	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No. 10/806,514	Applicant(s) FROHS ET AL.	
	Examiner Anish Desai	Art Unit 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-18 is/are pending in the application.
- 4a) Of the above claim(s) 9-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

The applicant's arguments in response to the Office action dated 07/11/06 have been fully considered.

1. Claims 1-2 and 4-18 are pending, claims 9-18 are withdrawn, and claim 3 is cancelled.
2. The art rejections of Chuoku (GB 1548046) taken alone and in combination are withdrawn in view of the present amendment and response (see page 4 of 10/10/06 amendment). Chuoku does not teach or suggest coefficient of thermal expansion as claimed in claim 1.
3. A new 112 rejection is made for claims 5 and 6.
4. The art rejections of Mochida et al. (US 5,205,888) are maintained.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 5 and 6 depend from claim 1. Claim 1 requires that the connecting piece comprises carbon material electrode connecting piece body, wherein said body comprises carbon fibers and coating. Claims 5 and 6 recite mass fraction of carbon fibers in the connecting piece body is from 0.2 to 10%

Art Unit: 1771

and mass fraction of coating on carbon fibers based on the mass of carbon fibers is from 0.2 to 15% respectively. Regarding claim 5, since the mass fraction of carbon fiber is only 0.2 to 10% in the connecting piece body and the mass fraction of coating on the carbon fiber is only 0.2 to 15%, a question is raised as to whether if there is any other material being present in the connecting piece body other than the carbon fibers and the coating? If there is other material being present in the connecting piece body then what is it? For purpose of the examination, claim 5 is interpreted as mass fraction of carbon fibers is based on total mass of carbon fibers and coating in the connecting piece body and claim 6 is interpreted as mass of the coating on the carbon fibers is based on the total mass of the carbon fibers.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1771

6. 1,4, and 6-8 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mochida et al. (US 5,205,888) substantially as set forth in 07/11/06 Office action.

Regarding claim 1, Mochida teaches a process for making carbon fiber reinforced materials. Additionally, Mochida teaches that carbon fiber reinforced carbon materials are used in many fields including space industry, electronic industry etc. (column 1, lines 14-16). The process of making carbon fiber reinforced materials includes a step of impregnating a carbon fiber assembly with a melt of mesophase pitch or mixing short carbon fibers with the mesophase pitch, shaping the pitch-impregnated assembly or pitch/short carbon fiber mixture, and firing the same (abstract). Additionally, the carbon fiber assembly of Mochida is subjected to a preliminary surface treatment such as oxidation (column 3, lines 1-3), which reads on carbon fibers having oxidatively activated surfaces as claimed. The carbon fiber assembly of Mochida reads on claimed connecting piece body. The examiner is interpreting "a connecting piece body" as recited in the preamble of claim 1 as any article comprising carbon fibers will read on "a connecting piece body". According to Mochida, another requirement that should be met by the mesophase pitch for use in the present invention is that it achieves a carbonization yield of 100% (column 3, lines 38-43), which reads on coating being carbonized as a carbonization product of a coating material selected from the group consisting wax, pitch, natural resins, thermoplastic polymers, and thermosetting polymers as claimed.

Regarding claim 1, Mochida teaches claimed invention except the carbon material electrode connecting piece body having a linear coefficient of thermal expansion of from  $-0.5$  to  $+0.1 \mu\text{m}/(\text{K}\cdot\text{m})$  in a direction parallel to a lateral surface thereof, and from  $1.7$  to  $2.1 \mu\text{m}/(\text{K}\cdot\text{m})$  in a normal plane orthogonal thereto, however it is reasonable to presume that the carbon fibers of Mochida have a linear coefficient of thermal expansion of from  $-0.5$  to  $+0.1 \mu\text{m}/(\text{K}\cdot\text{m})$  in a direction parallel to a lateral surface thereof, and from  $1.7$  to  $2.1 \mu\text{m}/(\text{K}\cdot\text{m})$  in a normal plane orthogonal, because like material has like property. The applicant is using polyacrylonitrile (PAN) based carbon fibers (page 11, Specification) that are oxidatively activated. Mochida also teaches the use of PAN based carbon fibers that are subjected to a preliminary surface treatment such as oxidation. Therefore, the presently claimed properties would have been present (see *In re Fitzgerald* 205 USPQ 594 and *In re Best*, 195 USPQ at 433, footnote CCPA 1977).

With respect to claims 4, 7, and 8, Mochida teaches that the carbon fiber assembly to be used in the present invention is formed of various kinds of carbon fibers including PAN (column 2, lines 61-63) and the carbon fiber assembly may be a web of unidirectional fibers, a two-dimensional woven fabric or nonwoven fabric sheet. Two or more of these assemblies may be combined (column 2, lines 63-66). Additionally Mochida discloses that carbon fiber length is variable from  $50 \mu\text{m}$  to  $10 \text{ mm}$  depending on the use of the final product and on the specific characteristics required (column 3, lines 7-8). With respect to claim 6, Mochida discloses the claimed invention except that the mass fraction of the coating on the carbon fibers, based on the mass of the carbon

Art Unit: 1771

fiber is from 0.2 to 15%. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the mass fraction of the coating on carbon fibers from 0.2 to 15%, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233). Accordingly, Mochida anticipates or strongly suggests the claimed subject matter.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mochida et al. (US 5,205,888) in view of *Handbook of Carbon, Graphite, Diamond and Fullerenes – Properties, Processing and Applications* (see, Chapter 8, Table 8.6, Page 191) substantially as set forth in the 02/09/06 Office action.

The invention of Mochida is previously disclosed. Mochida is silent as to teaching of carbon fibers having a modulus of elasticity of from 200 to 250 Gpa. However, *Handbook of Carbon, Graphite, Diamond and Fullerenes – Properties, Processing and Applications* discloses applications of molded graphite in production of electrodes (Chapter 5, page 110, Table 5.11). Additionally, the handbook discloses carbon fibers with modulus of elasticity of 205-235 GPa (see, Chapter 8, Table 8.6, Page 191). Thus a skilled artisan would have found it obvious to use the carbon fibers having the modulus as disclosed in the aforementioned handbook in the carbon fiber assembly of Mochida, motivated by the desire to provide sufficient strength to the carbon fiber assembly.

Art Unit: 1771

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mochida et al. (US 5,205,888) in view of Griffin et al. (US 4, 998, 709).

The invention of Mochida is previously disclosed. Mochida is silent as to teaching of mass fraction of carbon fibers in connecting piece body is from 0.2 to 10%. However, Griffin teaches a method of making graphite electrode nipple. The graphite nipples of Griffin comprise about 8 to 20 wt% of carbon fibers (see claim 1 of Griffin). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add the amount of carbon fibers as taught by Griffin in the carbon fiber assembly of Mochida, motivated by the desire to provide carbon fiber assembly with sufficient strength.

### ***Response to Arguments***

9. Applicant's arguments filed on 10/10/06 have been fully considered.

Art rejections of Mochida are maintained for the following reasons. The applicant agrees with the examiner that Mochida describes a process for making carbon fibers reinforced materials. Applicant further agrees that Mochida teaches that the carbon fibers being used should preferably be subjected to a preliminary surface treatment such as oxidation (page 5 of 10/10/06 amendment). However, the applicant asserts that the difference between the claimed subject matter and the subject matter disclosed by Mochida are as follows (a) a carbonized coating added to the carbon fibers having oxidatively activated surfaces; and (b) the omission of the above described preliminary heat treatment of about 600 °C in an inert gas atmospheres (page 5 of 10/10/06 amendment). It is noted that the applicant has generally pointed out the difference



Art Unit: 1771

between the reference of Mochida and the claimed subject matter, but did not further discussed as to what is the significance of these differences. Therefore, the applicant's response is incomplete with respect to the rejections of Mochida. With respect to the applicant's pointed difference (a), note that the claim requires "carbon fibers having oxidatively activated surfaces, and a coating added to said carbon fibers, said coating being carbonized as a carbonization product of a coating material selected...pitch".

Mochida teaches pitch impregnated carbon fiber assembly wherein the mesohase pitch (coating) achieves carbonization yield of 100% (column 3, lines 14-15). Additionally the applicant has already agreed with the examiner that Mochida teaches that the carbon fibers are subjected to a preliminary surface treatment such as oxidation. Therefore, Mochida meets the requirement of "carbon fibers having oxidatively activated surfaces, and a coating added to said carbon fibers, said coating being carbonized as a carbonization product of a coating material selected...pitch" as claimed. With respect to the applicant's pointed difference (b), it is the examiner's position that said difference is irrelevant to the basis of the rejection because it unclear as to what is the significance of (b) to the rejection of Mochida. Accordingly, art rejections are maintained.

Art Unit: 1771

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anish Desai whose telephone number is 571-272-6467. The examiner can normally be reached on Monday-Friday, 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

APD



TERREL MORRIS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700